SUPERFUND RESPONSE ACTION PRIORITY PANEL REVIEW FORM **Date Form Completed:** 01/18/13 **General Site Information** Region: 7 City: Kansas City State: Kansas CERCLIS EPA ID: MON000705443 Southwest Jefferson County Mining CERCLIS Site Name: Year Listed to NPL: NPL Status: (P/F/D) Final 2009 Brief Site Description: (Site Type, Current and Future Land Use, General Site Contaminant and Media Info, Site Area and Location information.) The Southwest Jefferson County Mining (Site) encompasses the entire county which is approximately 30 miles southwest of St. Louis. The Site excludes the Herculaneum Lead Smelter site (CERCLIS No. MOD006266373), which has defined boundaries. Historically, the Site's focus was on an area of approximately 166 square miles located in the southwest quarter of Jefferson County, but due to transportation of lead contaminated materials expanding beyond the historic Site boundary, the Site has been expanded county-wide to address this contamination. The county is bordered on the north by St. Louis County and the Meramec River, on the east by the Mississippi River, on the south by St. Genevieve and St. François Counties and on the west by Washington and Franklin Counties. Jefferson County encompasses 664 square miles. The western and southern boundaries of the Site and contiguous with the boundaries of the Washington County Lead and St. François County lead sites. OU-1, OU-2, and OU-3 for the Site consist of residential properties and child high-impact areas that have been impacted by past mining practices and the migration of the resulting mine waste. OU-1, OU-2, and OU-3 are separated due to sellers/haulersof contaminated materials. **General Project Information** Type of Action: Remedial Site Charging SSID: A7D2 Operable Unit: 1, 2, and 3 CERCLIS Action RAT Code: Is this the final action for the site that will result in a site construction completion? X Yes No Yes Will implementation of this action result in the Environmental Indicator for Human Exposure \times No being brought under control? Response Action Summary Describe briefly site activities conducted in the past or currently underway: In March 2007, a Pre-CERCLIS Site Screening Assessment (SSA) of the Site was conducted. As part of the SSA, a reconnaissance was conducted at 252 potential mining sites in Jefferson County identified by the Inventory of Mines, Occurrences, and Prospects database. Of the nine source areas sampled, three contained concentrations of lead greater than 1200-ppm, with values ranging from 1,447 ppm to 7,070 ppm. Three other source areas contained concentrations of lead ranging from 442 ppm to 1,070 ppm. Five of the six source areas with elevated lead concentrations are located on residential properties. X-Ray Fluorescence Spectrometer (XRF) screening of the residential vard soil samples indicated a significant impact on environmental media from historical mining activities. Of the 125 residential and school yards sampled during the pre-CERCLIS SSA, nine of the samples contained concentrations of lead in the soils greater than 1,200 ppm, and 21 of the soil samples contained concentrations of lead greater than or equal to 400 ppm. Sampling data from the school property did not show elevated levels of metals associated with mining operations in the area.

In 2008, the EPA conducted a PA/SI which provided the following results: Arsenic and lead were identified in residential groundwater at concentrations that exceed health-based benchmarks, lead in residential soils and

groundwater appears attributable to past mining activities and the source of the arsenic contamination is unidentified but is likely naturally occurring or from treated wood or pesticides. Data collected during previous sampling events indicate that residents could be exposed to contaminated soil and groundwater; therefore, additional investigations were recommended to further characterize and delineate the extent of contaminated soil and groundwater. Limited surface water and sediment sampling were conducted as part of this SI to characterize this migration pathway. Results obtained suggested a release to Big River, which contains wetland areas and is designated as a fishery by the State. Further characterization of this pathway was recommended to determine the extent of contamination and the source(s) of the elevated lead levels. The characterization of the surface water pathway will be completed under OU-4.

The Site was proposed for National Priorities List (NPL) listing on April 9, 2009, and was listed on the NPL on September 23, 2009.

In 2010, the EPA began a Remedial Investigation/Feasibility Study (RI/FS), characterizing the nature and extent of risk posed by the mining-related contamination and evaluating the potential remedy options. This RI incorporated investigation activities for OU-1, OU-2, OU-3 (residential soils) and OU-5 (Groundwater).

The EPA completed the RI in May 2012 and the FS in June 2012. The goal of the RI/FS was to gather information sufficient to support an informed risk-management decision regarding which remedy appears to be most appropriate for the Site. Results of the RI identified lead as the contaminant of concern (COC) for the residential soil OUs with an action level for soil equal to or greater than 400 ppm. The RI also identified arsenic and chromium as COCs with soil action levels of 22 ppm and 29 ppm, respectively. The arsenic and chromium are found to be collocated with the lead contamination. Remediation of the residential properties with lead in surface soil greater than or equal to 400 ppm will reduce exposure to these other COCs. The FS developed the alternatives for the RA for the residential properties.

The EPA has conducted removal activities since November 2007 consisting of excavation and disposal for residential soils exceeding 1,200 ppm lead and child care facility soils exceeding 400 ppm lead. Treatment of soils was only conducted on waste failing the Toxicity Characteristic Leaching Procedure (TCLP) analysis for disposal.

To date, the EPA has performed site-wide sampling of 2,070 residential properties for soil, with 1,611 being associated with OU-1, 162 associated with OU-2, and 337 associated with OU3. In OU-1, 162 properties exceeded 1,200 ppm, qualifying the property for a time-critical removal, and 409 properties have lead-soil concentrations between 400 ppm and 1,200 ppm. In OU-2 82 properties exceeded 1,200 ppm, qualifying the property for a time-critical removal, and 9 properties have lead-soil concentrations between 400 ppm and 1,200 ppm. In OU-3 120 properties exceeded 1,200 ppm, qualifying the property for a time-critical removal, and 56 properties have lead-soil concentrations between 400 ppm and 1,200 ppm. Time-Critical Removal Actions (TCRAs) have been completed at most properties; however, the removal action is ongoing and new properties may be identified prior to an RA taking place. Groundwater was sampled at the Site from 654 groundwater wells; 79 exceeded the action level of 15 μ g/L at the wells, and 44 of those exceeded the lead action level at the primary drinking taps. Alternative water continues to be provided until the groundwater OU-5 ROD is completed. The EPA has been providing bottled water to residents of properties where lead in groundwater exceeds the lead action level of 15 μ g/L.

Specifically identify the discrete activities and site areas to be considered by this panel evaluation:

Alternative 2: Maximum 12-inch Excavation, Disposal, Vegetative Cover, Health Education and Institutional Controls:

Under this alternative, residential properties with at least one quadrant surface soil sample testing greater than 400 ppm for lead will have that quadrant remediated. If the drip-zone surface soil sample from any property where a soil quadrant is being remediated also exceeds a concentration of 400 ppm lead, the property will also have the drip-zone soil remediated. Residential properties where only the drip-zone soil and no other quadrant soil exceeds 400 ppm lead will not be addressed in this action. Based on existing surface-soil sampling data and trends in that data, 875 residential properties (800-OU-1, 16-OU-2, 59-OU-3) contain or are expected to contain lead surface-soil concentrations greater than 400 ppm and will require remediation.

Approximately 1,620 residences (all associated with OU-1) at the Site have not had their soil sampled by the EPA. Under this alternative, the EPA will continue to seek access to sample residential properties as evidence indicates areas that may be impacted by lead contaminated soils at the Site to determine if they have been impacted by mining-related activities and upon request from residents.. Additional sampling is also required at residential properties in the Big River floodplain which have been impacted by decades of mine waste sediments from upstream sources in the Southeast Missouri Mining District. If a soil sample for a property quadrant has a lead concentration greater than 400 ppm, the property will be included in the RA.

This alternative includes the excavation and removal of lead-contaminated surface soil, backfilling the excavation with clean soil, and seeding/soding. Excavation of a residential property would be triggered when the highest recorded surface soil sample for any defined area of the property contains greater than 400 ppm lead. Soil would be excavated using limited size and lightweight excavation equipment and hand tools in the portions of the property where the surface soil exceeds 400 ppm lead. Excavation will continue in depth until the underlying soil at the bottom of the excavation is less than 400 ppm lead or to a maximum depth of 12 inches bgs, whichever is less. An exception is garden areas, where the maximum depth of excavation will be 24 inches bgs. If at 12 inches bgs the lead soil concentration is greater than 1,200 ppm, EPA will place a visible marker barrier at 12 inches bgs. The barrier placed will be a visible plastic barrier (such as an orange-mesh plastic sheet) that is permeable, wide meshed, and will not affect soil hydrology or vegetation. The physical barrier will function as a visual warning that digging lower will result in exposure to soil contaminated at a level that EPA has determined to be a human health concern. EPA recommends a minimum of 12 inches of clean soil be used as an adequate soil barrier from soil contaminated above the cleanup level for the protection of human health. The rationale for establishing a minimum clean soil thickness of 12 inches is that the top 12 inches of soil is considered available for direct human contact.

The excavated soil will be disposed at an EPA approved disposal facility. The EPA has previously used the Timber Ridge Landfill in Richwoods, Missouri, in accordance with federal, state and local disposal permits. For contaminated soils which fail the Toxicity Characteristic Leaching Procedure (TCLP) analysis, a lead stabilization compound will be added to the soil at the residential property until the soil no longer fails the TCLP standard for lead. Additional disposal locations may be explored if they can meet applicable regulatory requirements.

Clean fill and topsoil would be used to replace soil removed after excavation, returning the residential property to its original elevation and grade. Clean fill and topsoil means, at a minimum, containing a lead level less than 100 ppm and passing other metals' screening levels.

As indicated earlier, EPA estimates that 875 residences have been or will be discovered to have lead concentrations in surface soil greater than 400 ppm. Based on EPA's previous soil removal activities at the Site, an average residential property will require removal and replacement of 330 cubic yards of soil. Therefore, an estimated total of approximately 288,640 (264,000-OU-1, 5280-OU-2, 19,360-OU-3) cubic yards of soil would require excavation, disposal, and replacement. EPA also plans to provide HEPA vacuums to Jefferson County Health Department to be loaned out to the community as needed. This estimated total is used as the basis for part of the cost estimate for this remedial action.

Briefly describe additional work remaining at the site for construction completion after completion of discrete activities being ranked:

OU-4 requires a RI/FS, a ROD and implementation of the remedy

OU-5 requires a FS, a ROD and implementation of the remedy

OU-6 requires negotiations with the PRP and the implementation of the remedial process

OU-7 requires a RI/FS, a ROD and implementation of the remedy

OU-8 requires a RI/FS, a ROD and implementation of the remedy

Response Action Cost

Total Cost of Proposed Response Action:

(\$ amount should represent total funding need for new RA funding from national allowance above and beyond those funds anticipated to be utilized through special accounts or State Superfund Contracts.)

\$31.75 Million

Source of Proposed Response Action Cost Amount:

(ROD, 30%, 60%, 90% RD, Contract Bid, USACE estimate, etc...)

ROD estimates

Breakout of Total Action Cost Planned Annual Need by Fiscal Year:

(If the estimated cost of the response action exceeds \$10 million, please provide multiple funding scenarios for fiscal year needs; general planned annual need scenario, maximum funding scenario, and minimum funding scenario.)

OU-1 - \$28.40 Million total

- Approximately \$5.60 Million per year for first five years for construction
- Approximately \$400,000 over the following 25 years for five-year reviews and IC

OU-2 - \$888,000 total

- Approximately \$785,000 for first year for construction
- Approximately \$95,000 over the following 25 years for five-year reviews and IC

OU-3 - \$2.47 Million total

- Approximately \$2.36 Million per year for first year for construction
- Approximately \$110,000 over the following 25 years for five-year reviews and IC

Total Cost – \$31.75 Million over a five year construction period and additional 25 year IC and fiveyear review period. Other information or assumptions associated with cost estimates?

The remainder of the cost for the Operable units is the assumed cost in the RODs for long term IC implementation and Five-Year review cost.

Readiness Criteria

1. Date State Superfund Contract or State Cooperative Agreement will be signed (Month)?

Unknown at this time, however, the state is currently preparing a State Superfund Contract.

2. If Non-Time Critical, is State cost sharing (provide details)?



3. If Remedial Action, when will Remedial Design be 95% complete?

The Remedial Design for OU-1 consists of sampling additional properties and developing a soil removal approach for properties in the Big River floodplain. The estimates for properties in the various OUs areas are based on historic sampling to include the Big River Floodplain properties. Additional design work will be ongoing for a set of properties within the floodplain that may be subject to recontamination during flood events. The Remedial Design for these floodplain OU-1 properties is estimated to be complete 05/30/13. These properties will be addressed in subsequent years and are included in the cost estimates.

The Remedial Designs for OU2 and OU3 were completed on 12/12/12 along with the non-floodplain properties in OU-1.

4. When will Region be able to obligate money to the site?

08/30/13

5. Estimate when on-site construction activities will begin:

9/30/13

6. Has CERCLIS been updated to consistently reflect project cost/readiness information?

Yes

Site/Project Name:

Southwest Jefferson County Mining Site OU-1, OU-2, and OU-3

Criteria #1 - RISKS TO HUMAN POPULATION EXPOSED (Weight Factor = 5)

Describe the exposure scenario(s) driving the risk and remedy. Include risk and exposure information on current/future use, on-site/off-site, media, exposure route, and receptors:

As part of the site-specific modeling, 72 surface soil samples were collected in October 2010 to determine the site-specific bioavailability of lead. It was decided to exclude seven of the 72 samples from further consideration because the total lead concentrations in these samples were less than 100 ppm (27.5 to 99.3 ppm), which is indicative of native material, and thus, may not represent mine-waste-impacted material. The remaining 65 samples analyzed resulted in a mean absolute bioavailability (ABA) of 16 percent. The lead ABA

of soil calculated for this Site using the initial EPA Region 7 laboratory results (16 percent) was much lower than what has been found at other EPA Region 7 lead sites in the Southeast Missouri Lead Mining District. Specifically, the mean ABA values calculated for Federal Mine Tailings site (St. Joe State Park), Washington County Mining site, Madison County Mining site, and Big River Mine Tailings site were 23 percent, 26 percent, 31 percent and 34 percent, respectively. Additionally, the mean ABA for 15 soil samples collected from parks in the Jefferson County Big River floodplain—the floodplain thought to be a primary source of contamination in the Southwest Jefferson County Mining site—was 31 percent. Thus, there was considerable uncertainty regarding whether the lead bioavailability calculated for this site was accurate.

Split samples from five of the surface soil sites were submitted to the Laboratory for Environmental and Geological Studies (LEGS) at the University of Colorado in Boulder on October 3, 2011, for lead speciation (speciation concerns the identification and quantitation of specific forms of an element) and reanalysis for lead bioaccessibility. The LEGS report stated that the "...majority of lead-containing particles have lead in a form that is bioaccessible." The in-vitro bioaccessible fractions in the report ranged from 0.63 to 0.72 percent, yielding a mean ABA value of 28 percent. The EPA determined that the mean ABA of 16 percent appeared to be underestimated. In contrast, the mean bioavailability calculated by LEGS in the follow-up analyses (28 percent) seemed consistent with what was found at other Southeast Missouri mining sites; therefore, a split of the original samples was sent to the EPA's Office of Research and Development laboratory for analysis, with a final result yielding a mean ABA of 33 percent. In past experience at Superfund sites where lead is the COC, the EPA generally selects a residential soil cleanup level within the range of 400 ppm to 1,200 ppm for lead based on the IEUBK model results and the nine-criterion evaluation included in this ROD and in accordance with the NCP. As described above, the IEUBK modeling results for the Site, along with the uncertainty provided by the datasets and multiple in vitro bioaccessibility sample results, indicate an ABA near 30 percent, the IEUBK default parameters.

The HHRA performed a qualitative analysis of arsenic in soils and concluded that arsenic is a COC for current and future exposures. Arsenic was identified as a noncancer risk driver at five properties and a cancer risk driver at one property out of the 232 properties evaluated. All of the samples with elevated arsenic levels were collocated with lead and will not require separate construction activities. Residential surface soil containing arsenic above 22 ppm will be remediated by removing up to 12 inches of soil and replacing with clean soil. This cleanup level was derived in a manner consistent with the 2010 Human Health Risk Assessment and current EPA risk assessment guidance and policy (USEPA, 2010). Given that background levels of arsenic in Jefferson County are greater than cleanup goals corresponding to cancer risks of 10⁻⁵ and 10⁻⁶ the cleanup level is based on the noncancer hazard index of one, which is lower than a cleanup goal based on a cancer risk of 10⁻⁴ (USEPA, 2010). Based on qualified Site data, it is anticipated that residential soil remediation will not be necessary for properties solely due to elevated arsenic levels. The EPA has decided that at residential properties where arsenic in soil presents a risk to children and is collocated with lead at a concentration greater than 400 ppm, the EPA will address this risk under this RA. Property sampling will have 10 percent of samples sent for laboratory analysis to monitor that arsenic, when located above its PRG level, is collocated with leadcontaminated soils. Should it be determined that arsenic or chromium is found above its respective PRG and is not collocated with lead above its PRG, the EPA will take action to address each metal at its respective PRG level.

The HHRA also determined that soil at one residential property out of the 232 properties evaluated in the HHRA may present a cancer risk of 10⁻⁴ to children due to elevated chromium. The property containing a chromium risk was also collocated with lead. Since chromium concentrations detected at the Site are only slightly elevated and infrequent, the EPA has decided that at residential properties where chromium in soil presents a risk to children and is collocated with lead at a concentration greater than 400 ppm, the EPA will

address this risk under this RA. Property sampling will have 10 percent of samples sent for laboratory analysis to monitor that chromium, when located above its PRG of 29 ppm, continues to be collocated with lead contaminated soils. In the event that chromium or arsenic is found above their respective PRGs and is not collocated with lead above its PRG, the EPA will take action to address these metals at their respective PRG levels.

These results, when considered in conjunction with the estimated number of properties yet to be sampled, indicate that approximately 875 un-remediated homes at the Site are of potential health concern with regard to lead.

Note: The EPA Region 7 considered the variability in the measured in-vitro bioaccessibility (IVBA) values in its risk management decision to select the default cleanup level of 400 ppm for lead. The measured IVBA values ranged from a low of 25.6 percent up to a high of 94.8 percent. The application of a site-specific RBA in the development of a cleanup level for the range of residential properties at the Site would not be protective of residences with soils that are associated with higher bioavailability.

Estimate the number of people reasonably anticipated to be exposed in the absence of any future EPA action for each medium for the following time frames:

<u>MEDIUM</u>	<2yrs	<10yrs	>10yrs
Surface Soil	875 homes	Unknown	Unknown
Dust	875 homes	Unknown	Unknown

Discuss the likelihood that the above exposures will occur:

Elevated blood-lead results in children have been identified and linked to lead contaminated soils under the removal program. Additionally, of the 1,951 residential properties evaluated during the HHRA, children residing at 543 properties (28%) are predicted to have greater than a 5 percent chance of exceeding a blood lead level of $10 \mu g/dL$.

Other Risk/Exposure Information?

Arsenic and Chromium were identified as COCs in the 232 properties evaluated for non lead mining related metals. Arsenic was identified as a non-cancer risk at five properties and a cancer risk at one property. Chromium was identified as a cancer risk at one property. All elevations were collocated with lead contamination above 400 ppm, and while EPA does not anticipate finding arsenic or chromium contamination above their remediation concentrations, EPA will continue 10% sampling for both metals.

Site/Project Name:

Southwest Jefferson County Mining Site OU-1, OU-2, and OU-3

Criteria #2 - SITE/CONTAMINANT STABILITY (Weight Factor = 5)

Describe the means/likelihood that contamination could impact other areas/media given current containment:

Lead contaminated residential surface soil is highly mobile during both wet and dry periods as mud on shoes and pets and dust on shoes, pets and wind migration respectively. This migration creates additional exposure routes from indoor dust on floors and window sills. It is likely that modification of residential properties resulting from filling, grading, or other activities could potentially relocate lead contamination at the surface to other areas or media. Erosion of surface soil during rain events is also likely to transport lead-contaminated soil. Additionally, several homes reside in the Big River floodplain and experience regular flooding that creates

additional erosion transportation. As part of the sampling events, results are mailed to homeowners along with multiple ATSDR fact sheets in an effort to minimize migration of soil into the home.

Are the contaminants contained in engineered structure(s) that currently prevents migration of contaminants? Is this structure sound and likely to maintain its integrity?

No.

Are the contaminants in a physical form that limits the potential to migrate from the site? Is this physical condition reversible or permanent?

No.

Are there institutional physical controls that currently prevent exposure to contamination? How reliable is it estimated to be?

No.

Other information on site/contaminant stability?

Site/Project Name:

Southwest Jefferson County Mining Site OU-1, OU-2, and OU-3

Criteria #3 - CONTAMINANT CHARACTERISTICS (Weight Factor = 3)

(Concentration, toxicity, and volume or area contaminated above health based levels)

List Principle Contaminants (Please provide average and high concentrations.):

(Provide upper end concentration (e.g. 95% upper confidence level for the mean, as is used in a risk assessment, or maximum value [assuming it is not a true outlier], along with a measure of how values are distributed {e.g. standard deviation} or a central tendency values [e.g., average].)

<u>Contaminant</u>	*Media	**Concentrations
Lead	SL - Soil	10 to over 11,528 ppm in surface soil at approximately 2,070 residential properties

(*Media: AR – Air, SL – Soil, ST – Sediment, GW – Groundwater, SW – Surface Water)

(**Concentrations: Provide concentration measure used in the risk assessment and Record of Decision as the basis for the remedy.)

Describe the characteristics of the contaminant with regards to its inherent toxicity and the significance of the concentrations and amount of the contaminant to site risk. (Please include the clean up level of the contaminants discussed.)

Lead can affect almost every organ and system in your body. The main target for lead toxicity is the nervous system, both in adults and children. Long-term exposure of adults can result in decreased performance in some tests that measure functions of the nervous system. It may also cause weakness in fingers, wrists, or ankles. Lead exposure also causes small increases in blood pressure, particularly in middle-aged and older people and can cause anemia. Exposure to high lead levels can severely damage the brain and kidneys in adults or children

and ultimately cause death (2007 ATSDR). An estimated at 875 properties have soil lead concentrations at or exceeding 400 ppm. The 400 ppm action level for lead in residential soil is based on the site-specific HHRA.
Describe any additional information on contaminant concentrations which could provide a better context for the distribution, amount, and/or extent of site contamination. (e.g. frequency of detection/outlier concentrations, exposure point concentrations, maximum or average concentration values, etc)
Other information on contaminant characteristics?

Site/Project Name:	Southwest Jefferson County Mining Site OU-1, OU-2, and OU-3				
Criteria #4 - THREAT TO SIGNIFICANT ENVIRONMENT (Weight Factor = 3)					
(Endangered species or their critical habitats, sensitive environmental areas.)					
Describe any observed or predicted adverse impacts on ecological receptors including their ecological significance, the likelihood of impacts occurring, and the estimated size of impacted area:					
OU-1, OU-2, and OU-3 are for residential yards and only address the human health risk posed by soils at residential properties within the Site boundaries. Although an Ecological Risk Assessment is undergoing completion for the OU-4, OU-5, and OU-6 with finalization scheduled 05/31/13, a summary of those risks would be applicable here because its emphasis is focused on streams, lakes, and unpopulated areas, and not on residential soils. Consideration was not given to residential soils when developing the Ecological Risk Assessment because they were not considered to be ecologically sensitive habitat. In addition, the preliminary data provided indicates that the ecological cleanup goal for lead in nonresidential soils will likely exceed the human health cleanup goal, and would therefore be addressed through the implementation of the remedial action described above.					
Would natural recovery occur if no action was taken?					
Other information on threat to	significant environment?				
Site/Project Name:	Southwest Jefferson County Mining Site OU-1, OU-2, an	d OU-3			
Criteria #5 – PROGRAMMATIC CONSIDERATIONS (Weight Factor = 4) (Innovative technologies, state/community acceptance, environmental justice, redevelopment, construction completion, economic redevelopment.)					
Describe the degree to which	the community accepts the response action.				
In general, the local communOU-1, OU-2, and OU-3.	nity, including local citizens and officials, support the re	esponse action sele	ected for		
Describe the degree to which the State accepts the response action.					
The state supports the recommended remedial action alternative and concurs with the remedial action alternative selected in the ROD for OU-1, OU-2, and OU-3. The state of Missouri has the cleanup of legacy lead mining sites as their top environmental priority.					
Describe other programmatic considerations, e.g.; natural resource damage claim pending, Brownfields site, use of innovative technology, construction completion, economic redevelopment, environmental justice, etc					

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